

In the claims:

Please cancel claim 9 and amend Claims 1-8 and 10-41 as follows:

1. (Currently amended) A method for optical-light scanning of a specimen using with a scanning microscope with an optical element, the method comprising ~~comprises the steps of:~~

providing a focused light beam, wherein the focused light beam defines a beam path characterized by a light beam intensity;

scanning the focused light beam across a specimen region ~~(3) thereby to define~~ defining a current focus position ~~(2); and~~

using the optical element disposed along the beam path to regulate ~~regulating~~ the light beam intensity ~~of the light beam~~ by determining a function of the current focus position ~~(2) of the focused light beam~~ in the specimen region ~~(3) of the scanned, focused light beam.~~

2. (Currently amended) The method as defined in Claim 1, ~~characterized in that the step of wherein using the optical element~~ regulating the intensity of the light beam is accomplished comprises determining as a the function of ~~the a~~ current axial focus position.

3. (Currently amended) The method as defined in Claim 1, ~~characterized in that the step of wherein using the optical element~~ regulating the intensity of the light beam is accomplished comprises determining as a the function of ~~the a~~ current lateral focus position.

4. (Currently amended) The method as defined in Claim 1, ~~characterized in that the wherein the current~~ focus positions ~~in a specimen region that~~ is defined by a ~~an~~ user.

5. (Currently amended) The method as defined in Claim 1, further comprising ~~comprises the steps of~~ mounting the specimen on a mounting medium, the mounting medium defining a refractive index, wherein using the optical element ~~regulating the intensity of the light beam is accomplished~~ comprises determining as a the function of the refractive index.

6. (Currently amended) The method as defined in Claim 1, ~~characterized in that light intensity regulation is accomplished~~ wherein using the optical element disposed along the beam path to regulate the light beam intensity by determining a function of the current focus position further comprises utilizing an expert system implemented in a control computer of the scanning microscope in conjunction with the optical element. ~~an expert system implemented in a control computer of the scanning microscope.~~

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7. (Currently amended) The method as defined in Claim 1, further comprising: ~~comprises the step of:~~ recording data; and
visualizing the data based on the information about the light beam intensity at the step of recording. ~~, thereby taking information into account concerning light intensity regulation during the recording of data.~~

8. (Currently amended) The method as defined in Claim 7, further comprising implementing ~~characterized in that~~ a computer restoration method or a digital reconstruction method by using the information about the light beam intensity at the recording step. ~~is implemented and the information regarding light intensity regulation during recording data is taken into account in the computer restoration method or the digital reconstruction method.~~

9. (Cancelled)

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10. (Currently amended) The method as defined in Claim 1 ~~9~~, ~~characterized in that the~~ wherein the optical element is an active optical element ~~(9) consists essentially of comprising~~ an acousto-optical modulator (AOM), an acousto-optical tunable filter (AOTF) or an acousto-optical deflector (AOD).

11. (Currently amended) The method as defined in Claim 1 ~~9~~, wherein the optical element ~~characterized in that light intensity regulation is accomplished with~~ a passive optical element ~~(9) arranged in the beam path (7, 8) of the scanning microscope (1).~~

12. (Currently amended) The method as defined in Claim 11, wherein the passive optical element is characterized in that a neutral density filter disk is used as the passive optical element (9).

13. (Currently amended) The method as defined in Claim 1, wherein the focused light beam is generated by characterized in that a light source (10) generates the light beam and the and wherein using the optical element to regulate the light beam intensity regulation is accomplished at comprises varying the intensity of the light source (10).

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14. (Currently amended) The method as defined in Claim 6, wherein characterized in that the control computer (11) of the scanning microscope (1) activates controls the active, passive optical element (9) and the a light source (10).

15. (Currently amended) The method of Claim 1, characterized in that further comprising:

providing a transmission detection apparatus (13) is provided in coupled with the scanning microscope (1); and

using the transmission detection apparatus to detect a maximum signal yield (13) is adapted as a function of the current focus position (2) in the specimen region. of the scanned, focused light beam, in such a way that a maximum signal yield is detectable with the transmission detection apparatus (13).

16. (Currently amended) The method as defined in Claim 15, wherein the characterized in that the transmission detection apparatus comprises a lens system responsive to as a function of the a current axial focus position (2).

17. (Currently amended) The method as defined in Claim 16, wherein the lens system characterized in that adaptation is accomplished by positioning the of the transmission detection apparatus (13) is disposed in the an axial direction.

18. (Currently amended) The method ~~of as defined in~~ Claim 16, further comprising the lens system having a magnification and being responsive to the function characterized in that adaptation is accomplished by changing the magnification. of the lens system of the transmission detection apparatus (13).

19. (Currently amended) The method ~~of as defined in~~ Claim 16, further comprising characterized in that a transmission detector is attached to the coupled to the transmission detection apparatus (13) and the transmission detector of the transmission detection apparatus (13) is correspondingly adapted as a function of the responsive to a function of the current focus position (2).

20. (Currently amended) The method ~~of as defined in~~ Claim 19, wherein the transmission detector is responsive to the function of the current focus position characterized in that adaptation is accomplished by being positioned positioning the transmission detector of the transmission detection apparatus (13) in the an axial direction.

21. (Currently amended) A scanning microscope for scanning a specimen comprising:
a light source for generating a focused light beam defining a beam path of a light beam intensity;

means for scanning the focused light beam across a specimen region (3) ~~thereby defining to define~~ a current focus position (2), and

an optical element disposed along the beam path for regulating the light beam intensity of the light beam, by determining a function of the current focus position (2) in the specimen region (3) of the scanned, focused light beam.

22. (Currently amended) The scanning microscope as defined in Claim 21, wherein the characterized in that the means the optical element for regulating the light beam intensity of the light beam ~~incorporate~~ further comprises means for regulating the light beam intensity of the focused light beam as a function of the a current axial focus position.

23. (Currently amended) The scanning microscope as defined in Claim 21, wherein the
~~characterized in that the means~~ the optical element for regulating the light beam intensity ~~of the~~
~~light beam incorporate~~ further comprises means for regulating the light beam intensity of the
focused light beam as a function of ~~the~~ a current lateral focus position.

24. (Currently amended) The scanning microscope as defined in Claim 21, further
comprising ~~characterized in that~~ means for defining focus positions in the specimen region by a
user. ~~are provided that the focus positions in a specimen region is defined by an user.~~

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25. (Currently amended) The scanning microscope as defined in Claim 21, further
comprising ~~characterized in that~~ a control computer, ~~is provided with the scanning microscope~~
and an expert system to regulate the light beam intensity ~~is implemented the control computer for~~
~~performing the light intensity regulation.~~

26. (Currently amended) The scanning microscope as defined in Claim 21, further
comprising ~~comprises~~ means for recording and visualizing data in response to ~~and the means for~~
~~recording and visualizing data take information into account concerning light intensity~~
regulation of the light beam intensity during the recording of the data.

27. (Currently amended) The scanning microscope as defined in Claim 21, wherein the
optical element for regulating the light beam intensity is an active optical element. ~~characterized~~
~~in that the scanning microscope (1) defines a beam path (7, 8) and an active optical element (9) is~~
~~positioned in the beam path (7, 8) to accomplish light intensity regulation.~~

28. (Currently amended) The scanning microscope as defined in Claim 27, wherein the
~~characterized in that the~~ active optical element (9) ~~consists essentially of~~ is an acousto-optical
modulator (AOM), an acousto-optical tunable filter (AOTF) or an acousto-optical deflector
(AOD).

29. (Currently amended) The scanning microscope as defined in Claim 27 21, wherein
the optical element for regulating the light beam intensity is characterized in that light intensity
regulation is accomplished with a passive optical element (9) arranged in the beam path (7, 8) of
the scanning microscope (1).

30. (Currently amended) The scanning microscope as defined in Claim 29, wherein the
characterized in that a neutral density filter disk is used as the passive optical element (9) is a
neutral density filter disk.

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31. (Currently amended) The scanning microscope as defined in Claim 21, wherein the
characterized in that the light beam intensity regulation is regulated accomplished at- by
regulating the intensity of the light source (10).

32. (Currently amended) The scanning microscope as defined in ~~the~~ Claims 27 21,
wherein the light source and the optical element for regulating the light beam intensity is
operated by a characterized in that the control computer. (11) of the scanning microscope (1)
activates the active, passive element (9) and the light source (10).

33. (Currently amended) The scanning microscope as defined in Claim 21, further
comprising characterized in that a transmission detection apparatus (13) is provided in the
scanning microscope (1), the transmission detection apparatus (13) is adapted in a manner
responsive to the current focus position to receive a signal yield, as a function of the current
focus position (2) in the specimen region of the scanned, focused light beam, in such a way that a
maximum signal yield is detectable with the transmission detection apparatus (13).

34. (Currently amended) The scanning microscope as defined in Claim 33, wherein the
characterized in that the transmission detection apparatus comprises a lens system, and the lens
system of the transmission detection apparatus is correspondingly adapted in a manner
responsive to as a function of the a current axial focus position (2).

35. (Currently amended) The scanning microscope as defined in Claim 34, wherein the lens system is responsive to the current axial focus position ~~characterized in that adaptation is accomplished by positioning the lens system in of the transmission detection apparatus (13) in the an axial direction.~~

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36. (Currently amended) The scanning microscope as defined in Claims 34, wherein the lens system is characterized by a magnification and is responsive to the function ~~characterized in that adaptation is accomplished by changing the magnification. of the lens system of the transmission detection apparatus (13).~~

37. (Currently amended) The scanning microscope as defined Claims 34, wherein ~~characterized in that a transmission detector is attached to the transmission detection apparatus comprises a (13) and the transmission detector of the transmission detection apparatus (13) is correspondingly adapted responsive to the as a function of the current focus position (2).~~

38. (Currently amended) The scanning microscope as defined in Claim 37, wherein the transmission detector is positioned ~~characterized in that adaptation is accomplished by positioning the transmission detector of the transmission detection apparatus (13) in the an axial direction.~~

39. (Currently amended) The scanning microscope as defined in Claim 21, wherein the specimen to be scanned is characterized in that fluorescing specimens are excited using with a one-photon excitation process.

40. (Currently amended) The scanning microscope as defined in Claim 21, wherein the specimen to be scanned is characterized in that fluorescing specimens are excited using with a two-photon excitation process.

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41. (Currently amended) The scanning microscope as defined in Claim 21, wherein the specimen to be scanned is characterized in that fluorescing specimens can be excited using with a multi-photon excitation process.
